

## Measurement of $^{228}\text{Ra}$ and $^{226}\text{Ra}$ by $\gamma$ - Ray Spectrometer in Drinking Water

Robert Rosson, Bernd Kahn, Jeff Lahr and Dave Crowe

Environmental Resources Center  
Georgia Institute of Technology, Atlanta, GA 30332

**Abstract** – EPA in FR 65, No.236, pp. 76708 – 76753 ( December 7, 2000 ) issued new National Primary Drinking Water Regulations which affect  $^{228}\text{Ra}$  analysis by eliminating screening and requiring its analysis on all samples. This will have a major impact on monitoring costs and manpower using the current EPA 904.0 procedure. Therefore, a method that is simple, reliable and rapid is needed. Coprecipitation of radium with barium as a sulfate ( Kahn et al. 1990 ) was reviewed and the detection limits and sample volumes evaluated for newer Germanium detectors. In the procedure, the precipitate is stored for ingrowth of Rn-222 and Ac-228 so that gamma rays emitted by radium progeny Pb-214/Bi-214 and Ac-228 can be counted. It had been demonstrated that the sulfate matrix quantitatively traps the radon daughters. The method was tested with radium tracer solutions and EPA intercomparison samples over the range 0.04 to 1 Bq L<sup>-1</sup>. Based on the efficiency and background of the earlier detector, the sample volume calculated to meet a detection limit of 0.04 Bq L<sup>-1</sup> by counting for 6,000 s was 3.7 liters ; with the newer detectors, the higher efficiency and lower background permits analysis of a 2 liter sample.

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Bernd Kahn, Robert Rosson and Joel Cantrell "Analysis of Ra-228 and Ra-226 In Public Water Supplies by a Gamma Ray Spectrometer," **Health Physics**, **59**, 125-131, July 1990.